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Case Report

Conjunctival auto transplantation for severe post-trabeculectomy hypotony: a case report

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ABSTRACT

Severe ocular hypotony following trabeculectomy with Mitomycin-C (MMC) is an uncommon but vision-threatening complication that may lead to chorioretinal folds and persistent visual impairment. Management is often challenging, especially when excessive filtration and bleb atrophy are present. Following bilateral trabeculectomies enhanced with MMC, a 59-year-old man with open-angle glaucoma experienced increasing chorioretinal folds and persistent hypotony. Multiple conservative and surgical interventions—including additional scleral flap sutures, cycloplegics, soft contact lens use, and intracameral viscoelastic injection—provided only temporary improvement. Due to persistent overfiltration and bleb thinning, a conjunctival autotransplantation procedure was performed to mechanically reduce filtration. Following surgery, intraocular pressure stabilized between 12–14 mmHg, and visual acuity improved moderately, although chorioretinal folds remained partially unresolved.

Conjunctival autotransplantation can be an effective option to restore intraocular pressure in cases of hypotony caused by excessive filtration and bleb atrophy after MMC-augmented trabeculectomy. Early identification and intervention are essential to prevent irreversible chorioretinal damage.

Keywords: Trabeculectomy, Mitomycin-C, Hypotony, Conjunctival autotransplantation, Overfiltration, Bleb atrophy

Introduction

Trabeculectomy remains one of the most widely performed surgical procedures for lowering intraocular pressure (IOP) in patients with medically uncontrolled glaucoma. Despite its long-standing effectiveness, the procedure can be associated with a spectrum of postoperative complications, particularly when antifibrotic agents such as Mitomycin-C (MMC) are used to enhance bleb function and reduce scarring [1]. MMC significantly increases the success rate of trabeculectomy; however, its potent suppression of wound healing may lead to overfiltration, bleb thinning, and the development of ocular hypotony [2].

Ocular hypotony is a potentially vision-threatening condition and may manifest with symptoms ranging from anterior chamber shallowing to chorioretinal folds, maculopathy, or even permanent structural damage [3]. Particularly in younger or myopic patients, thin-walled, avascular filtering blebs formed following MMC-augmented trabeculectomy are more frequently linked to hypotony maculopathy [4]. Since chronic hypotony might result in irreparable visual loss, prompt diagnosis and treatment are essential.

Management strategies for post-trabeculectomy hypotony include conservative options such as cycloplegics, viscoelastic injections, pressure patching, and topical steroids; however, persistent cases frequently require surgical intervention [5]. Surgical techniques aim to reduce excessive filtration or reinforce the integrity of the scleral flap and conjunctiva. Among these,

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conjunctival autotransplantation has emerged as a reconstructive approach that restores tissue coverage, decreases overfiltration, and promotes re-establishment of physiological IOP [6].

This case report presents the clinical course of a patient who developed severe hypotony and chorioretinal folds following MMC-augmented trabeculectomy and was ultimately managed with conjunctival autotransplantation. The report highlights the challenges in treating hypotony maculopathy and demonstrates the potential role of conjunctival tissue reconstruction in restoring ocular tone.

Case presentation

A 59-year-old male with a history of bilateral open-angle glaucoma was followed regularly for progressive intraocular pressure (IOP) elevation despite maximum tolerated medical therapy. At initial diagnosis in January 2018, both eyes demonstrated ocular hypertension without evidence of glaucomatous neuropathy. With insufficient long-term pressure management, the patient was started on topical carbonic anhydrase inhibitors (Azopt, twice daily in both eyes). In March 2019, the left eye underwent selective laser trabeculoplasty (SLT), which only temporarily improved the condition. As you can see from **Figure 1**, the patient's eye before intervent was shown corneal edema due to insufficient long-term pressure management.

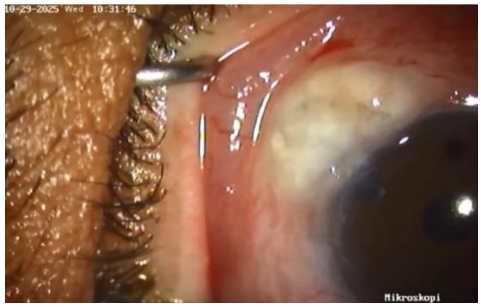


Figure 1. Photo of the left eye before the intervention.

Surgical history

In February 2020, a trabeculectomy was performed on the left eye (OS). The postoperative course was initially stable, and the patient required no topical therapy until September 2021. Due to continued disease progression, a repeat trabeculectomy with Mitomycin-C (MMC) was performed on the right eye (OD) in February 2022, followed by an MMC-augmented trabeculectomy in the left eye in April 2022.

During follow-up in August 2022, the right eye presented with significant hypotony (6–7 mmHg by applanation), a shallow anterior chamber, and clinically visible chorioretinal folds consistent with hypotony maculopathy. The left eye maintained a relatively stable IOP of 10–12 mmHg.

By late 2022, the patient experienced further decline in visual acuity in the right eye. In December 2022, he underwent phacoemulsification with intraocular lens implantation (PhaKO + IOL). However, in January 2023, best-corrected visual acuity (BCVA) in the right eye remained reduced at 0.3–0.4, and optical coherence tomography confirmed persistent chorioretinal folds.

Because of persistent severe hypotony related to overfiltration and bleb thinning, multiple interventions were attempted from 2023 to 2024. These included:

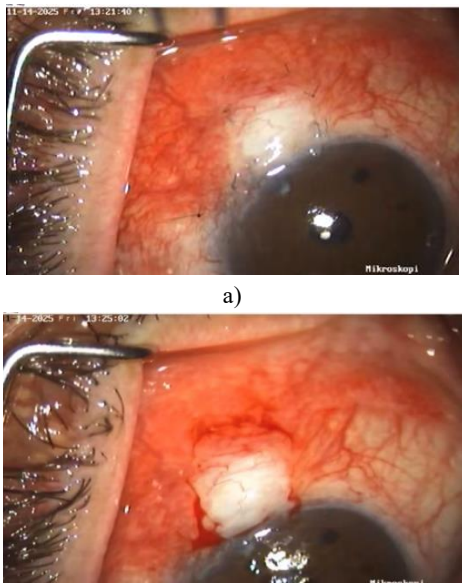
- placement of additional sutures on the scleral flap,
- topical cycloplegic agents,
- use of a soft bandage contact lens,
- intracameral viscoelastic injection, and
- external compression of the bleb.

All interventions provided only transient increases in IOP, with prompt return to hypotonic levels. The bleb progressively got more avascular and atrophic, indicating increased filtration as a result of MMC-induced wound healing suppression.

In October 2025, the patient underwent excision of the dysfunctional conjunctival bleb with placement of a conjunctival autotransplant to restore tissue integrity and reduce outflow. Postoperatively, the right eye achieved stable IOP values ranging from 12 to 14 mmHg by Goldmann applanation tonometry. BCVA improved modestly to 0.5–0.6 **(Figure 2)**.

Although the IOP normalized, chorioretinal folds persisted partially, indicating longstanding structural changes.

The left eye maintained a visual acuity of 10/10 with minimal functional impairment of the visual field and stable IOP throughout the follow-up period, in the **Figure 2** you can see the eye after surgery and the improvement of corneal edema, eye pressure was normalized to.



a)

b)

Figure 2. Photo of the patient's left eye after the intervention.

Results and Discussion

Post-trabeculectomy hypotony remains a significant clinical challenge, particularly when antifibrotic agents such as Mitomycin-C (MMC) are used to increase long-term surgical success. Although MMC enhances bleb survival by reducing subconjunctival fibrosis, it can also produce excessively thin,

avascular blebs that are prone to overfiltration and chronic hypotony. In this instance, following MMC-augmented trabeculectomies in both eyes—more severely in the right—the patient experienced extreme hypotony with chorioretinal folds. If hypotony lasts more than a few weeks or months, these well-documented structural retinal alterations may become irreversible [7].

The management of macular maculopathy requires timely intervention. Conservative options—including cycloplegics, viscoelastic injections, and pressure patching—often provide only transient benefit when filtration is excessive due to structural compromise of the scleral flap or conjunctiva [8]. In the present case, multiple nonsurgical attempts yielded only temporary normalization of intraocular pressure (IOP). This aligns with literature suggesting that persistent overfiltration typically requires reconstructive surgical repair to restore ocular integrity [9]. New surgical technique may require higher costs for the patient [10, 11], however, they increase patients satisfaction due to imporved clinical outcomes, shorter recovery time, reduced postoperative pain, and an overall improvement in quality of life [12].

Conjunctival autotransplantation has been reported as a useful technique in treating bleb leaks, overfiltration, and bleb atrophy by providing healthier conjunctival tissue to reinforce the outflow pathway and reduce excessive filtration [13]. In this case, excision of the dysfunctional bleb and placement of a conjunctival autograft successfully stabilized IOP between 12–14 mmHg. This outcome supports previous findings that reconstructive conjunctival surgery can effectively manage chronic hypotony when bleb morphology is severely compromised.

Despite the normalization of IOP, chorioretinal folds remained partially unresolved, suggesting irreversible structural retinal damage. Literature indicates that the prognosis of hypotony maculopathy strongly depends on the duration of hypotony before its correction [14]. The extended period of low IOP in this patient likely contributed to incomplete anatomical and functional recovery. Nonetheless, the improvement in BCVA from 0.3–0.4 to 0.5–0.6 demonstrates that restoring ocular tone can still provide meaningful visual benefit even in cases of long-standing hypotony.

Overall, this case highlights the importance of early recognition of MMC-related complications, timely surgical intervention, and individualized management strategies. Conjunctival autotransplantation remains a valuable option in cases of persistent overfiltration and bleb atrophy when conservative measures fail.

Conclusion

Severe hypotony following MMC-augmented trabeculectomy is a potentially vision-threatening complication that requires prompt diagnosis and targeted management. In this case, persistent hypotony caused by overfiltration and bleb atrophy did not respond adequately to conservative or minimally invasive interventions. Although some chorioretinal structural alterations remained permanent due to chronic hypotony, conjunctival autotransplantation successfully restored intraocular pressure to physiologic levels and enhanced visual performance.

This case underscores the importance of carefully balancing the benefits of MMC with its risks, monitoring bleb morphology closely, and intervening early when signs of overfiltration emerge. Reconstructive conjunctival surgery should be considered a viable and effective option in the management of chronic post-trabeculectomy hypotony, especially when bleb integrity is severely compromised.

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Conflict of interest: None

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Ethics statement: Trabeculectomy was performed based on clinical necessity to control intraocular pressure and prevent further visual loss. All clinical decisions were made in accordance with clinical ethics principles and in the patient's best interest, respecting dignity and confidentiality.

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